



*National Aeronautics and Space Administration
Goddard Earth Science Data Information and
Services Center (GES DISC)*

README Document for Global Landslide Exposure Maps, Ver. 1.0

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Revision History

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10/31/2022	Create ReadMe	Robert Emberson
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1.0 Introduction

This document provides basic information for using the Global Landslide Exposure Rasters.

The Global Landslide Exposure Rasters are 8 global rasters which provide an estimate of the exposure of population and infrastructure to rainfall induced landslide hazards.

1.1 Data Disclaimer

The data are the results associated with the research paper ‘New global characterisation of landslide exposure’ [Emberson et al. 2020].

1.1.1 Data Citation and Acknowledgment

Use of this data should cite the following: Emberson, R., Kirschbaum, D., and Stanley, T.: New global characterisation of landslide exposure, Nat. Hazards Earth Syst. Sci., 20, 3413–3424, <https://doi.org/10.5194/nhess-20-3413-2020>, 2020.

1.1.2 Contact Information

Contact: Robert Emberson, NASA GSFC. robert.a.emberson@nasa.gov

2.0 Data Organization

This dataset consists of 8 global rasters. These are split into two groups: long term average values, and the associated standard deviation values. The parameters are as follows:

1. Landslide hazard (annual average and standard deviation)
2. Population exposure to landslide hazard (annual average and standard deviation)
3. Road exposure to landslide hazard (annual average and standard deviation)
4. Critical infrastructure exposure to landslide hazard (annual average and standard deviation)

2.1 File Naming Convention

Files are named as follows:

Parameter	File name for annual average	File name for annual standard deviation
Landslide hazard	Nowcast_sum_annual_average.tif	Nowcast_stdev.tif

Population exposure	pop_exp_annual_average.tif	Pop_exp_stdev.tif
Road exposure	road_exp_annual_average.tif	Road_exp_stdev.tif
Critical infrastructure exposure	Crit_infr_expos_ras.tif	Crit_infr_stdev.tif

2.2 File Format and Structure

The files in this dataset are in GeoTIFF raster format (.tif extension). Their XY coordinate system is GCS_WGS_1984, with angular unit of degrees. Their spatial extent is -60 degrees S to 72 degrees North and covers the entire globe in longitude. The spatial resolution of the GeoTIFF raster files is 30x30 arc-seconds (1-km x 1-km).

3.0 Data Contents

All the 8 rasters in this dataset have the same spatial extent, coordinate unit, and angular unit, as defined in section 2.2 (i.e., they are global rasters). Each raster has only one data field. The units for these fields are shown below:

Parameter	Specific Unit (annual average)	Explanation	Type
Landslide Hazard	Nowcasts.yr ⁻¹	Nowcasts are the output of the NASA LHASA model. They represent a day when landslide hazard in each grid cell is elevated. The annual average is the sum for an entire year in a given grid cell.	32-bit floating point
Population exposure	Person-Nowcasts. yr ⁻¹ . km ⁻²	The exposure is estimated as number of Nowcasts per year in each square km multiplied by the population in that square km.	32-bit floating point
Road exposure	Nowcasts.km.yr ⁻¹ .km ⁻²	Sum of Nowcasts per square km multiplied by km of road within that square km.	32-bit floating point

Infrastructure exposure	Nowcasts.element.yr ¹ .km ⁻²	Includes the following critical infrastructure categories: hospitals, schools, fuel stations, power generation and transmission	32-bit floating point
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3.1 Data Set Attributes (File Metadata)

No metadata is provided.

4.0 Options for Reading the Data

The most appropriate way to read the data is using a GIS software package. ESRI ArcGIS is widely used, whereas QGIS is a open-source package that will also read the data.

GDAL (either in command line or python mode) can be used for programmatic access, but given the wide and diverse use of GIS software it is recommended that users start with a more user-friendly GIS package

5.0 GES DISC Data Services

If you need assistance or wish to report a problem:

Email: gsfc-dl-help-disc@mail.nasa.gov

Voice: 301-614-5224

Fax: 301-614-5268

Address:

Goddard Earth Sciences Data and Information Services Center NASA Goddard Space Flight Center Code 619.0 Greenbelt, MD 20771 USA

5.1 How To Articles

The GESDISC web site contains many informative articles under the “[How To Section](#)”, “[FAQ](#)” (frequently asked questions), “[News](#)”, “[Glossary](#)”, and “[Help](#)” . A sample of these articles includes:

[Earthdata Login for Data Access](#)

[How to Download Data Files from HTTPS Service with wget](#)

[How to Obtain Data in NetCDF Format via OpeNDAP](#)

[Quick View Data with Panoply](#)

[How to Read Data in NetCDF Format with R](#)

[How to Read Data in HDF-5 or netCDF Format with GrADS](#)

[How to read and plot NetCDF MERRA-2 data in Python](#)

[How to Subset Level-2 Data](#)

[How to use the Level 3 and 4 Subsetter and Regridder](#)

6.0 Acknowledgments

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7.0 References

Emberson, R., Kirschbaum, D., and Stanley, T.: New global characterisation of landslide exposure, *Nat. Hazards Earth Syst. Sci.*, 20, 3413–3424, <https://doi.org/10.5194/nhess-20-3413-2020>, 2020.